Frank Harlow, T-3, is retiring after 50 years of service to the Laboratory!

Please come to this honorary symposium to help celebrate his many technical achievements. No pre-registration necessary.


Harlow, 1975

Frank Harlow Symposium

Thursday, September 4, 2003
Los Alamos Research Park Conference Room
Room 203B (Motorola Building)

9:00 a.m. – 9:15 a.m. Opening Comments: Alan R. Bishop, T-Division Leader

9:15 a.m. – 10:30 a.m. Round Table - 1: Early Days of CFD and K-ε
Participants: Tony Amsden, T. Dan Butler, Bart Daly, Dick Gentry, Frank Harlow (co-head), Tony Hirt (co-head), Paul Nakayama, Bill Pracht, Eddie Welch
Abstract: As leader of the Los Alamos Fluid Dynamics Group T-3, Frank Harlow created a ground breaking computational physics center. He began the process in the late 1950s with his first remarkable development, the Particle-in-Cell method, for computing the dynamics of multiple materials undergoing large deformations. This was followed by a series of basic developments by Frank and his group that extended through the 1960s and into the early 1970s.

This Round Table is peopled by many of the T-3 Group members working with Frank in the 1960s. Their purpose is to relate their experiences and recollections of those days. By this means it is hoped that the audience will gain some idea of the challenges, flavor, and fun that Frank and his group experienced while helping to establish the field of computational fluid dynamics.

10:30 a.m. Service Award Presentation: LANL Director, Pete Nanos

10:45 a.m. – 12:00 noon Round Table - 2: CFD Today, Future Challenges
Participants: Didier Besnard, Jerry Brackbill (head), Timothy Clark, Michael Cline, Bucky Kashiwa, Douglas Kothe
Abstract: A discussion of current research topics in turbulence, multiphase flow, and particle methods illustrates Harlow's influence on contemporary computational modeling of fluid flows. A discussion of future challenges provides an opportunity not only to talk about those challenges the present has already revealed to us, but also to speculate imaginatively on how a Harlow of the 21st century might transform CFD.

1:00 p.m. – 2:30 p.m. Round Table - 3: Materials Modeling Effort
Participants: Scott Bardenhagen, John Dienes, Tom Mason, Paul Maudlin, Mark Schraad (head), Duane Zhang, Ken Zuo
Abstract: In what may seem an unexpected area for a fluid dynamics group, over the past several decades T-3 has cultivated a significant research program in solid mechanics. Many laboratory applications involve large deformations of solids at high rates of strain. Under these circumstances, the procedures used to solve the governing equations of motion make use of numerical methods that already had been developed for fluids, and so the T-3 group broadened the scope of their work. The goal is to develop predictive models that are based on the relevant physical mechanisms occurring at each underlying length scale.

Seven of Frank Harlow's colleagues, each with a T-3 connection, will come together to discuss current research topics in the materials modeling arena. Each will give a short presentation on a topic of interest, focusing on interesting results, aggravating challenges, and possibly even some modest modeling successes. The discussion will close with the controversial question of whether true predictability can ever be achieved.

2:45 p.m. – 4:15 p.m. **CFD Graphics - Frank Harlow**

Abstract: In this session, we show archival graphics that illustrate state-of-the-art calculational results obtained in T-3 for the first time anywhere in the world. Included are samples of the earliest computer-generated movies, which also incorporate real-world footage of such spectacular events as the destruction of the Tacoma-Narrows bridge. We also show modern computer-generated movies that describe some astonishingly complex flows of turbulent fluids, as calculated with the highly sophisticated numerical techniques that are currently implemented in codes being run on one of the world's largest computers.

Contact: Mike Steinkamp, 667-5837